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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/642,620	08/18/2000	John David Westwood	SJ0000008US1	8250

7590

10/23/2002

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EXAMINER

BERNATZ, KEVIN M

ART UNIT PAPER NUMBER

1773

DATE MAILED: 10/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/642,620

Applicant(s)

WESTWOOD, JOHN DAVID

Examiner

Kevin M Bernatz

Art Unit

1773

C-3-9

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 4-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group 1a (claims 1 – 3) in Paper No. 3 is acknowledged.

Examiner's Comments

2. For purposes of evaluating the prior art, the examiner has relied upon applicants' definition of "nanolamination" (page 3, lines 8 – 9) in which the limitation is read to mean a layer of about 3 Å or less.

Claim Objections

3. Claim 1 is objected to because of the following informalities: the language "group consisting of at least about 90% Fe, Co, and Ni" is confusing because it is unclear whether the limitation "at least about 90%" applies just to Fe, or to all of Fe, Co and Ni (i.e. is T allowed to be 10% Co? or must T comprise at least 90% of Fe, Co and Ni). For purposes of evaluating the prior art, claim 1 was interpreted to read: "wherein T is about 90 atomic percent or greater of at least one element selected from the group consisting of Fe, Co, and Ni, ..." (see applicants' specification, page 11, lines 20 – 22). Appropriate correction is required. Also, the examiner notes that the 90% refers to "atomic percent" (page 11, lines 20 – 22) and applicants' are requested to amend the claim to clarify this (see also Paragraph 5, below).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the phrase "at least about 90%" renders the claim(s) indefinite because the metes and bounds are ill defined. The mathematical expression "at least X", meaning any value greater than X, including X, is well defined if X is well defined. If X is not well defined, then the phrase is indefinite because it is unclear which values are to be excluded from the range. Deleting the word(s) "about" from the claim(s) is sufficient to overcome this rejection and would limit the range to values greater than or equal to 90 atomic percent (see also proposed language in Paragraph 3, above).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 – 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al. (U.S. Patent No. 5,998,016) in view of Kenji et al. (JP 63-299219 A). See provided Abstract translation of '219 A.

Regarding claim 1, Sasaki et al. disclose a magnetic soft thin film comprising a magnetic alloy (Figure 2, layer 24 and col. 5, lines 6 - 8) and at least a single nanolamination of a material meeting applicants' Markush limitation (Figure 2, layer 23; col. 4, line 60 bridging col. 5, line 5; col. 6, lines 19 - 32; and claim 11). The examiner notes that the various materials in applicants' Markush group are art recognized equivalent insulating materials for use in magnetic heads, sensors and transducers.

Sasaki et al. fail to disclose a magnetic film comprising a composition meeting applicants' claimed limitations.

However, Kenji et al. teach a magnetic film meeting applicants' claimed composition limitations possessing excellent soft magnetic properties, i.e. a high saturation magnetic flux density, low coercive force and high permeability (Abstract).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Sasaki et al. to use a magnetic film meeting applicants' claimed limitations as taught by Kenji et al. since such a film possesses excellent soft magnetic properties, such as a high saturation magnetic flux density, low coercive force and high permeability.

Regarding claim 2, Kenji et al. disclose films meeting applicants' claimed limitations (Abstract - FeSiN).

Regarding claim 3, Sasaki et al. disclose thickness values overlapping applicants' claimed limitation (claim 11 and col. 6, lines 29 - 31). The exact thickness is deemed a cause effective variable in terms of the diffusion properties. It would have been obvious to one having ordinary skill in the art to have determined the optimum

value of a cause effective variable such as the thickness of the anti-diffusion layer through routine experimentation given that the thinner the layer, the less material is used (i.e. cost savings) while the thicker the layer used, the better the diffusion prevention capabilities. *In re Boesch*, 205 USPQ 215 (CCPA 1980), *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

8. Claims 1 – 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (U.S. Patent No. 4,608,297) in view of Kenji et al. ('219 A). See provided Abstract translation of '219 A.

Regarding claims 1 and 3, Shimada et al. disclose a magnetic soft thin film comprising a magnetic alloy (Title and col. 1, lines 23 - 30) and at least a single nanolamination of a material meeting applicants' Markush limitation (col. 3, lines 45 – 49; col. 5, lines 66 – 67; col. 6, lines 3 – 6; col. 8, lines 10 – 20 and Figure 5).

While Shimada et al. does not disclose an embodiment explicitly meeting applicants' claimed thickness limitation (i.e. "about 3 Å or less"), the examiner notes that Shimada et al. teach minimizing the thickness (col. 8, lines 19 – 20: "the thickness of the SiO₂ layer is preferably 100 Å or less") and has provided a graph illustrating the impact on coercivity when different thickness values are used. Since soft magnetic films are required to possess a low coercivity, it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as the thickness of the insulating layer through routine experimentation, given the impact on coercivity shown in Figure 5. In addition, the examiner notes that the various

materials in applicants' Markush group are art recognized equivalent insulating materials for use in magnetic heads, sensors and transducers.

Shimada et al. fail to disclose a magnetic film comprising a composition meeting applicants' claimed limitations.

However, Kenji et al. teach a magnetic film meeting applicants' claimed composition limitations possessing excellent soft magnetic properties that are thermally stable, i.e. a high saturation magnetic flux density, low coercive force and high permeability (Abstract). While Shimada et al. requires a Co-alloy (and Kenji et al. teach primarily a Fe-alloy), the reason Shimada et al. has such a requirement is satisfied by the Kenji et al. composition, namely improved thermal stability, high saturation magnetization and good soft magnetic properties (Shimada et al., col. 3, lines 19 – 23; col. 4, lines 46 – 50; col. 5, lines 11 – 15 and lines 28 – 32).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Shimada et al. to use a magnetic film meeting applicants' claimed limitations as taught by Kenji et al. since such a film possesses excellent soft magnetic properties that are thermally stable, such as a high saturation magnetic flux density, low coercive force and high permeability.

Regarding claim 2, Kenji et al. disclose films meeting applicants' claimed limitations (Abstract - FeSiN).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shinjo et al. (U.S. Patent No. 5,315,282) teach a laminated MR element wherein the non-magnetic material can be materials meeting applicants' claimed limitations and can be formed of a thickness of 4 – 200 Å, with the minimum thickness only limited because "it is difficult to differentiate the directions of the magnetization of the magnetic thin layers" (col. 3, lines 24 – 43). Sin et al. (Sin, K., and Wang, S., IEEE Trans. Mag. 32(5), 1996, 3509 – 3511) teach FeN/AlN laminated film structures wherein Figure 1 illustrates the effect of varying the AlN film thickness from 0 – 140 Å, with 30 Å thick layers being disclosed as continuous. The examiner notes that Figure 1 shows that the effects of the layer are still present regardless of whether the layer is continuous or not (i.e. layers less than 30 Å in thickness still function). JP 01-099203 A teach that N, O and C are equivalent in soft magnetic materials for a magnetic head (Abstract). Terunuma (JP 04-240704 A) teach the equivalents between several insulating materials, as well as additives to FeN alloys (Abstract and Examples).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (703) 308-1737. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

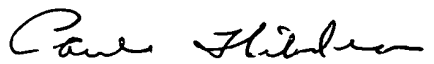
Application/Control Number: 09/642,620
Art Unit: 1773

Page 8

872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

KMB
October 17, 2002


Paul Thibodeau
Supervisory Patent Examiner
Technology Center 1700